Date of Request: June 12, 2009

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Investigator's Title/Affiliation: Graduate student/ UC Santa Cruz Ocean Sciences Department

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Institution: University of California, Santa Cruz

Collaborators: A. Christina Ravelo, UCSC Ocean Sciences Department, Ph.D. advisor
P. Polissar, UCSC Earth and Planetary Sciences Department, Visiting researcher

Project summary:

We aim to use records of hydrogen isotopes of terrestrial leaf wax compounds preserved in California margin marine sediments as a means of establishing estimates of paleo-precipitation. This work will help test the hypothesis that on million-year time scales sea surface temperatures of the North Pacific have significantly influenced the amount, spatial distribution, and source waters of coastal California's precipitation.

Sediment samples from the USGS repository will allow us to map the distribution of hydrogen isotopes in long chain *n*-alkanes of modern/near modern sediments along the California margin. This work will be used in order to provide the baseline relationship of δD of modern long chain *n*-alkanes to modern δD of precipitation on the California coast. The modern hydrogen isotope distribution based on *n*-alkanes extracted from USGS samples will then be compared to paleo-records generated from Ocean Drilling Program samples. The late Holocene ages of most of the samples in our USGS request have been verified by previously published radiocarbon dates. Organic extractions and isotopic analysis will be carried out in the Stable Isotope Laboratory at UCSC.

Potential impacts, major products, and timelines:

This project furthers the application of a relatively new paleoclimate proxy in a way that addresses the current paucity of paleo-precipitation data for western North America on million year timescales. Our comparison of modern δD distributions with the paleo δD distributions will produce some of the first geochemically based interpretations of water cycle changes of the late Miocene into the early/mid Pliocene in coastal California. This work should help to better quantify changes in precipitation during climate states that are quite different from modern.

I am currently beginning the fourth year of my Ph.D. program in Ocean Sciences at UCSC. My timeline for the abovementioned hydrogen isotope work includes completion of the modern/near modern lab work during the late summer and fall of 2009. Work on Miocene- and Pliocene-aged sediments from ODP samples will be complete by June of 2010. I am planning to write up and publish results during my fifth academic year at UCSC (2010/2011).

If this sample request is approved, I would like to travel to the USGS repository and sample the cores.

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Field Activity	Core ID	Half	Top (cm)	Bottom (cm)	volume	Comments
V-1-81-SC	15G1	W	0	24	10cc	sample as close to core top as possible within the listed interval
A-1-03-SC	SMB1-P1	W	0	116	10cc	sample as close to core top as possible within the listed interval
A-1-03-SC	SMB2-P1	W	0	183	10cc	sample as close to core top as possible within the listed interval
A-1-03-SC	HEIN2-PG1	W	0	90	10cc	sample as close to core top as possible within the listed interval
O-2-99-SC	508P1	W	0	130	10cc	sample as close to core top as possible within the listed interval
V1-80-NC	V1-80-NC-P3	W	0	20	10cc	sample as close to core top as possible within the listed interval
V1-80-NC	V1-80-NC-G01	W	0	20	10cc	sample as close to core top as possible within the listed interval
F-8-90-NC	18	W	0	20	10cc	sample as close to core top as possible within the listed interval
F-2-92-SC	PSTNP0029	W	0	39	10cc	sample as close to core top as possible within the listed interval
F-2-92-SC	PSTNP0003	W	0	30	10cc	sample as close to core top as possible within the listed interval
F-2-92-SC	PSTNP0034	W	0	31	10cc	sample as close to core top as possible within the listed interval
F-2-92-SC	PSTNP0040	W	0	46	10cc	sample as close to core top as possible within the listed interval
TN-96-NC	550	W	0	280	10cc	sample as close to core top as possible within the listed interval